



The **Tyndall** (Ad)Venture

**Overview Presentation for
CEC Climate Change
Conference**

Alex Haxeltine
Senior Research Associate

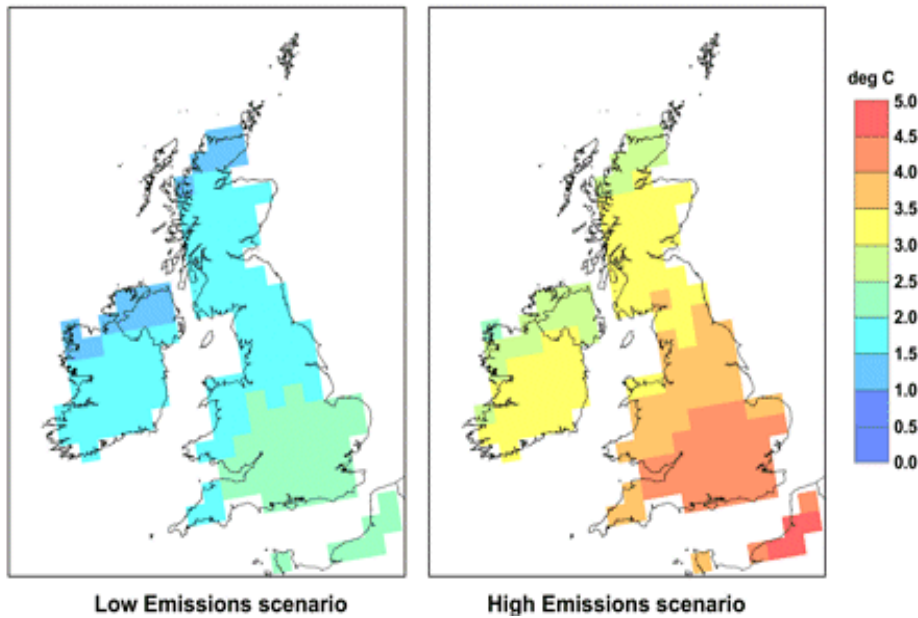


Sacramento, 10 June 2004

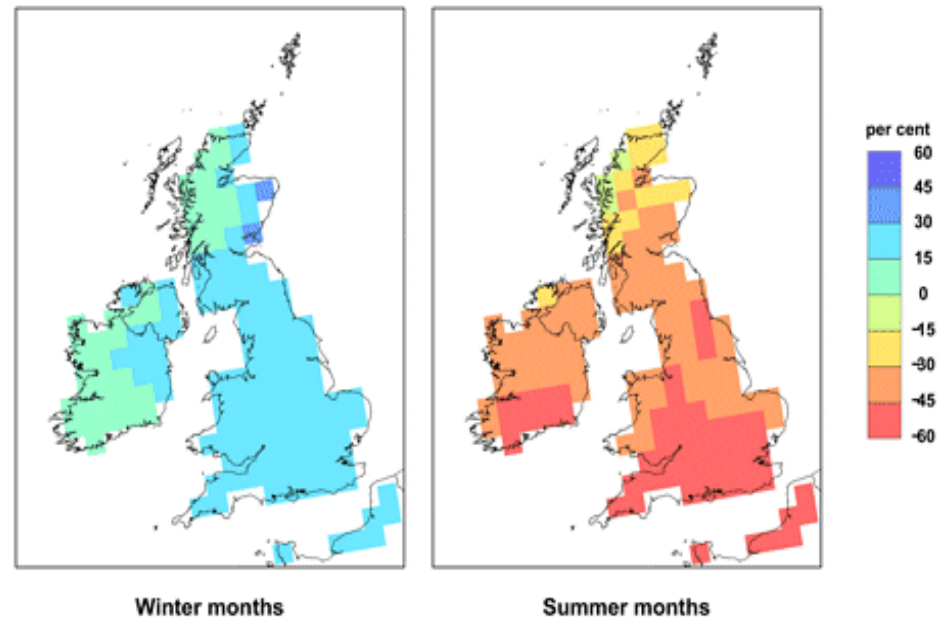
0. Introduction – the UK Context



Change in annual average daily temperature –2080s



Percent change in precipitation –2080s –High Emissions scenario



Recent economic losses substantial



European floods 2003

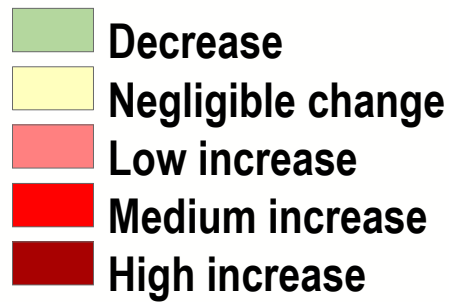
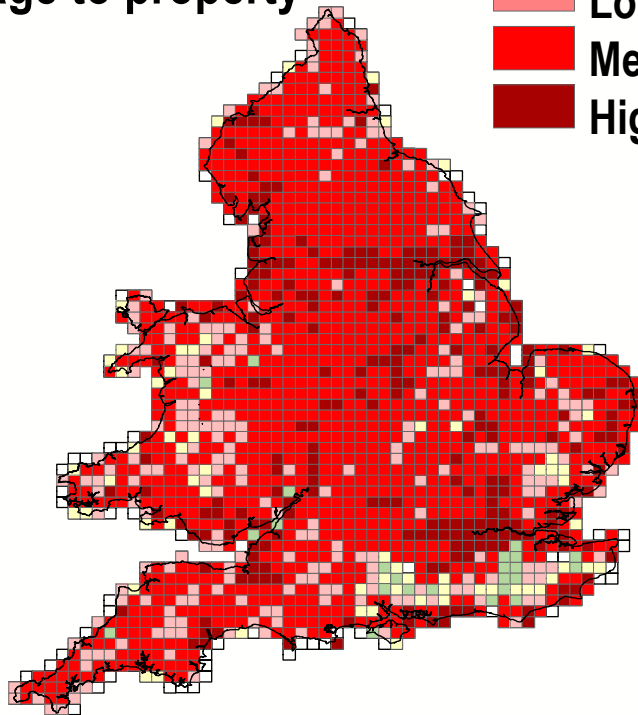
- 37 deaths
- \$16bn direct costs

European heat-wave 2004

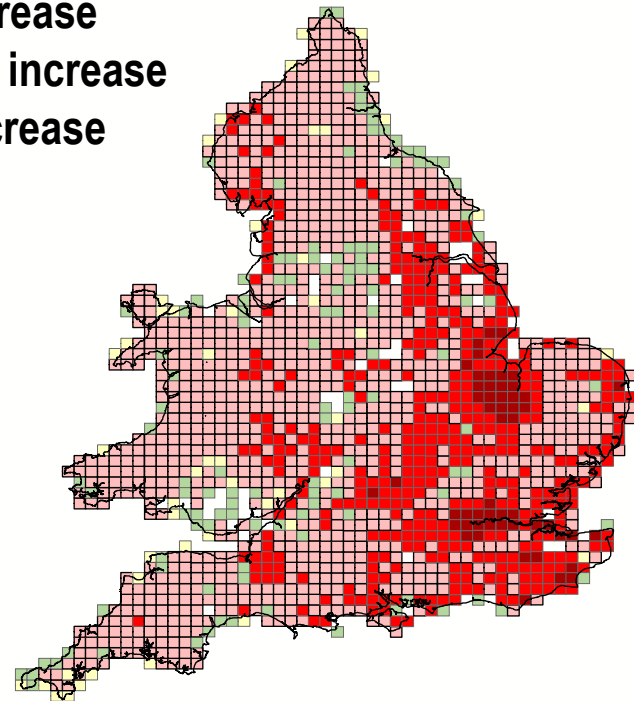
- 26,000 deaths
- \$13.5bn direct costs

Change to risk of flooding damage by 2080

Change in annual
economic
damage to property



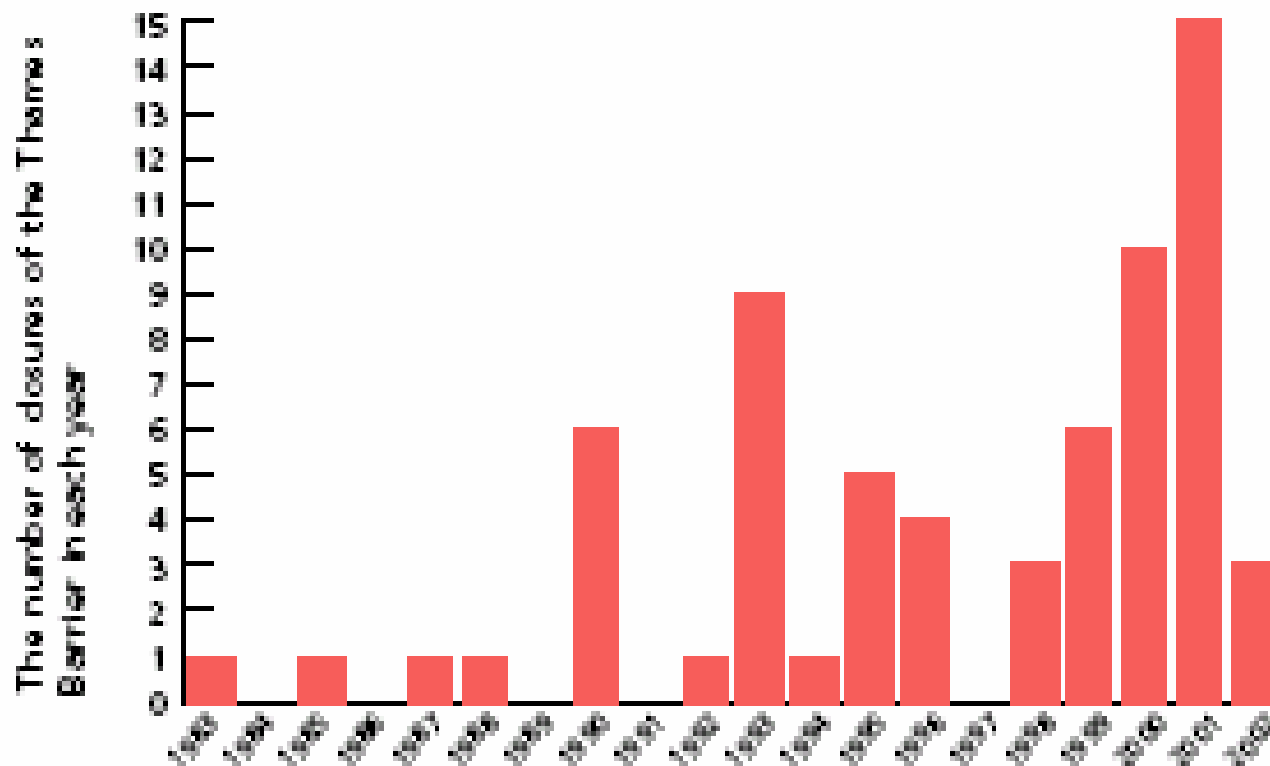
Change in number of people at
high risk



Closures of the Thames Barrier increasing

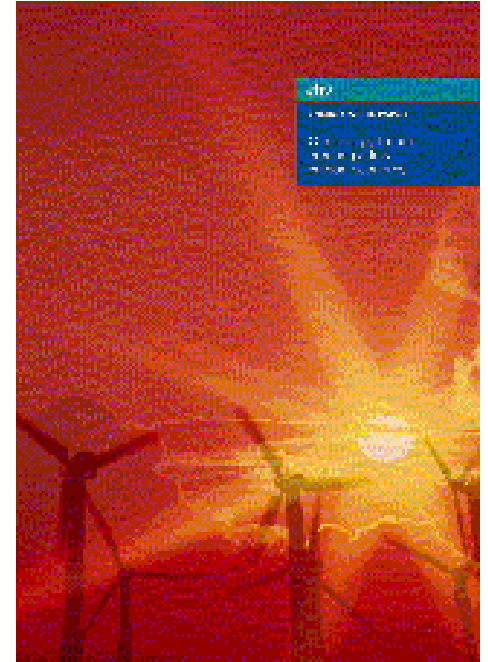
Annual Closure of Barrier

Number of Thames Barrier closures against tidal surges, 1983 - 2002



Our energy future: creating a low carbon economy

- “The UK should put itself on a path towards a reduction in carbon dioxide emissions of some 60% from current levels by 2050”
- “Our new energy policy will ensure that energy, the environment and economic growth are properly and sustainably integrated”

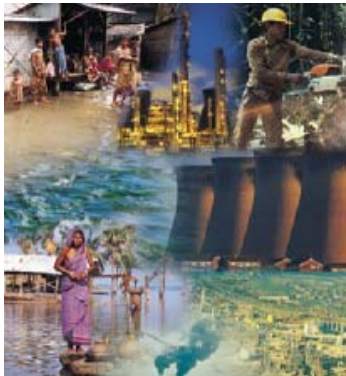


1. Tyndall I – the Blueprint



- **Our Mission:**

“...bringing together scientists, economists, engineers and social scientists, to develop sustainable responses to climate change”



**Theme 1 –
a *systems*
approach**



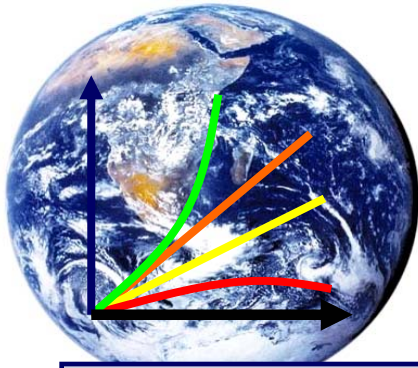
**Theme 2 –
a *targets*
approach**



**Theme 3 –
a *questions*
approach**



**Theme 4 –
a *place-based*
approach**



The Tyndall Centre – Objectives

- ***Advancing the science of integration*** ... to develop, demonstrate and apply new methodologies for integrating climate change related knowledge
- ***Developing responses*** ... to seek, evaluate and facilitate sustainable solutions that will minimise the adverse effects of climate change and stimulate policy for the transition to a more benign energy and mobility regime
- ***Motivating society*** ... to promote informed and effective dialogue across society about its ability and willingness to choose our future climate

Organised through Four Research Themes

Tyndall Consortium



Tyndall HQ



Tyndall North



Southampton Oceanography Centre
UNIVERSITY OF SOUTHAMPTON AND
NATURAL ENVIRONMENT RESEARCH COUNCIL



University of Southampton

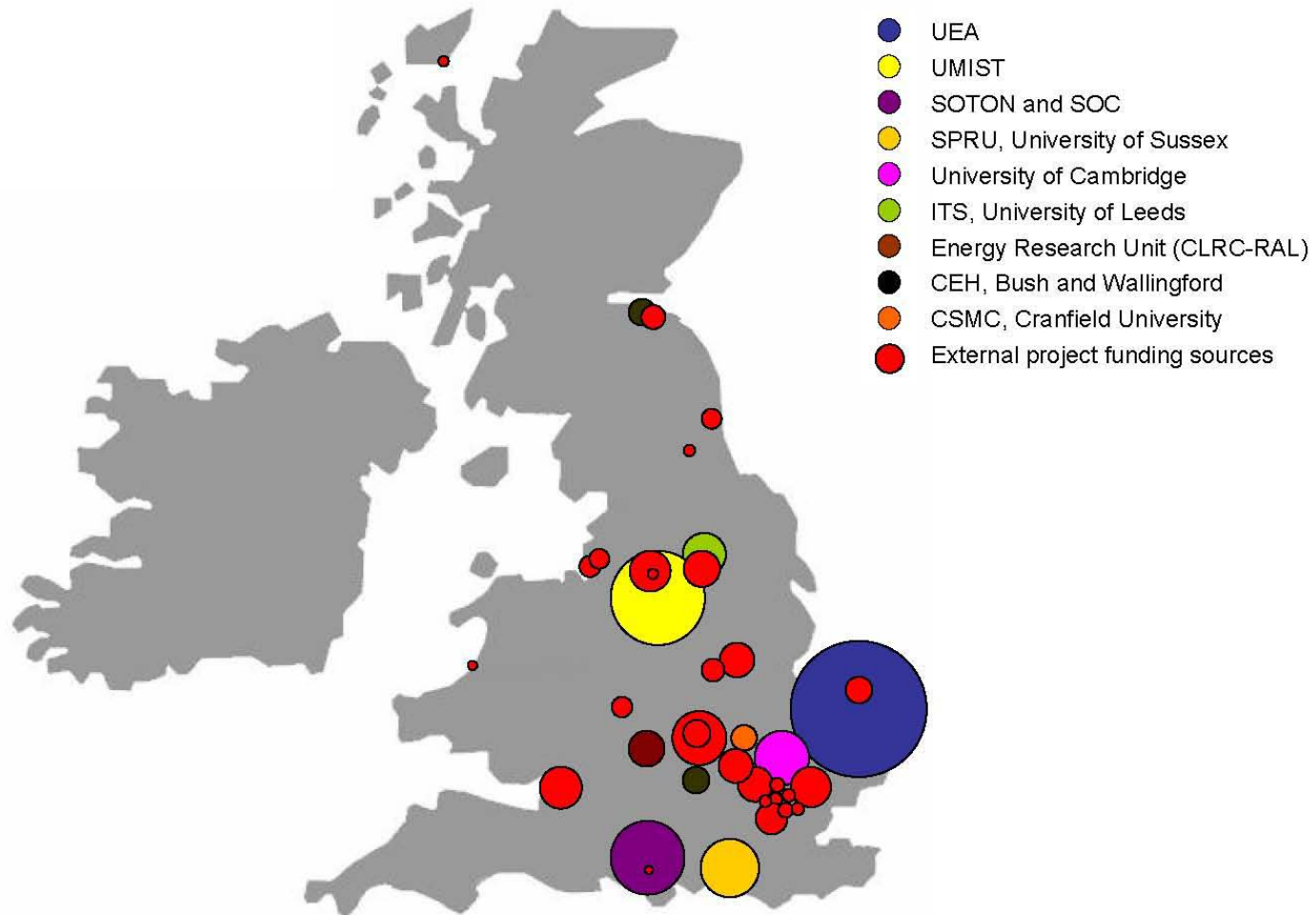
Tyndall South



UNIVERSITY OF CAMBRIDGE



Core Tyndall project funds awarded (Total = £5.6m)



RESEARCH

International Research Groups

MRC

BBSRC

NERC

UK Research Groups

IPCC

ESRC

Hadley Centre

Newton Institute

EPSRC

Tyndall
Centre

Environment
Agency

UKCIP

Civil Society

Non-UK Communities

DETR

DTI

NGOs

Busines
s

Consumer
s

*Future
Generations*

IENGOS

Devolved
Government

Local Government

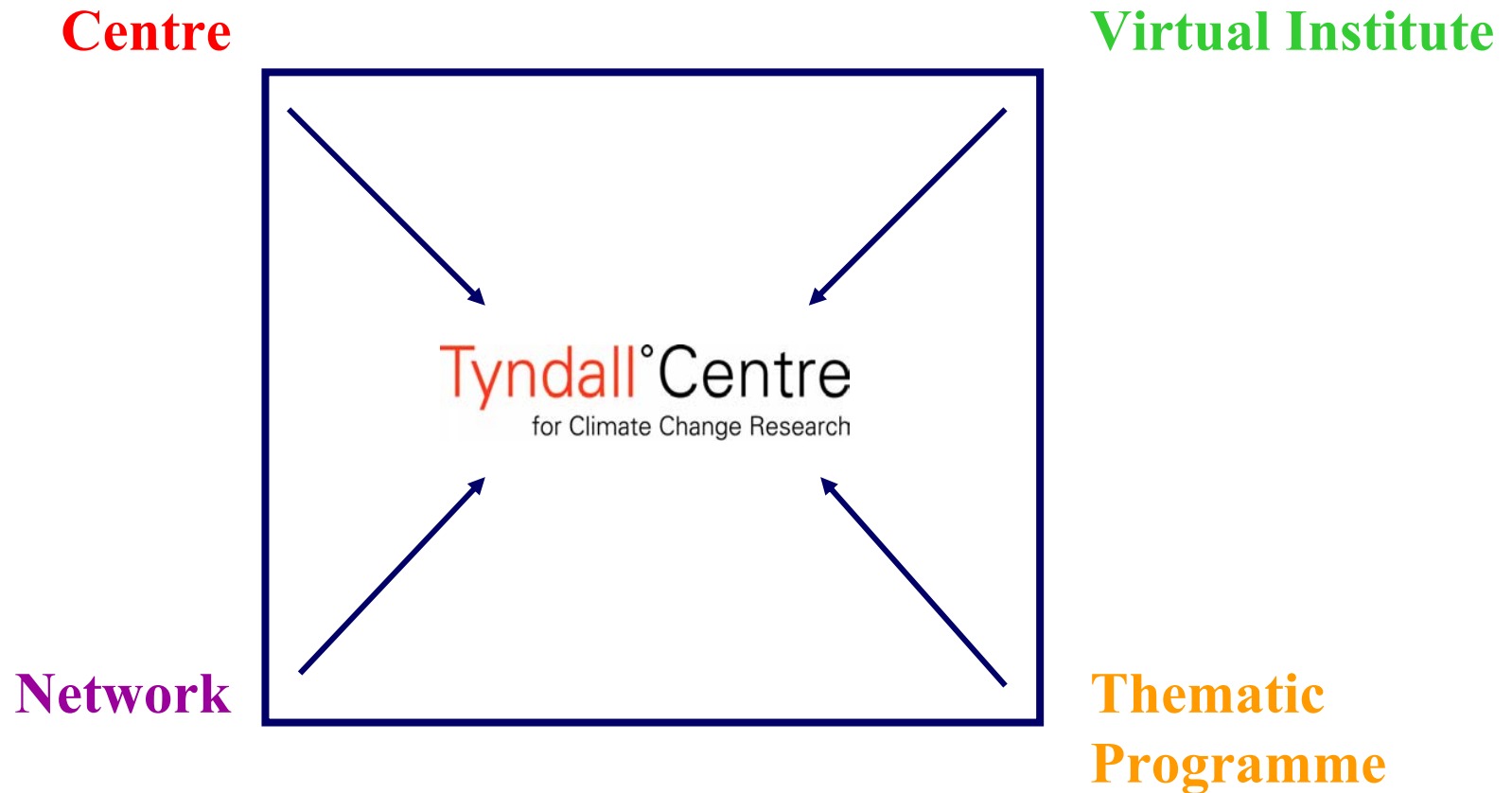
DFID

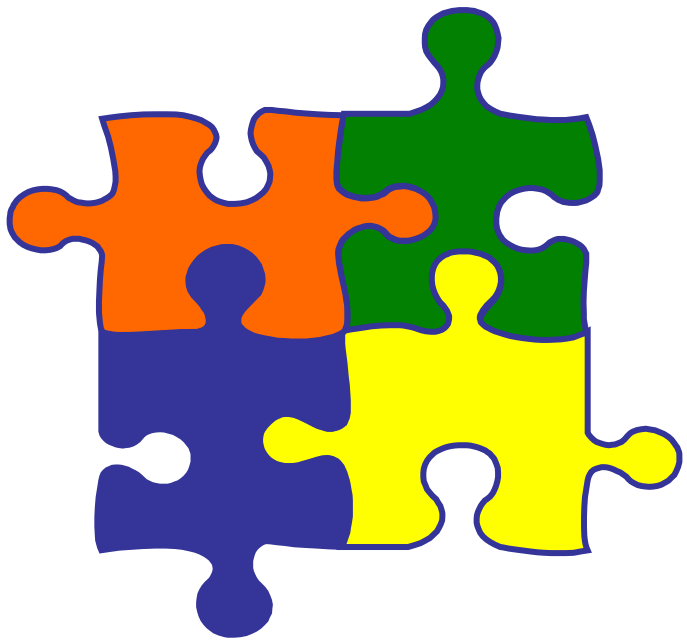
Foreign
Office

UN FCCC

IENGOS

The Nature of the Tyndall Centre





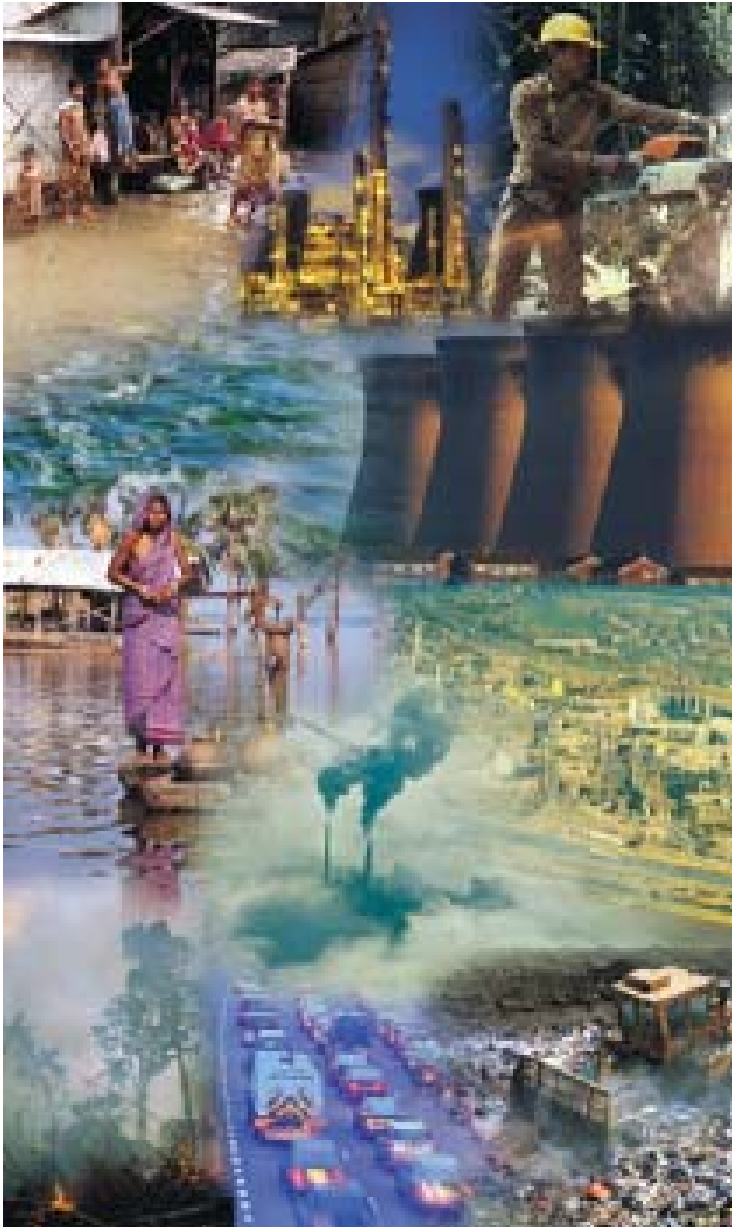
Tyndall Research themes

- 1. Integrating Frameworks**
- 2. Decarbonising Modern Societies**
- 3. Adapting to Climate Change**
- 4. Sustaining the Coastal Zone**

Integrating Frameworks – a *systems* approach

Some current projects:

- The Community Integrated Assessment Model
- ETech+: Modelling Technological Change
- Answering the Right Questions: The Interactive Integrated Assessment Process



Decarbonising Modern Societies – a *targets* approach

Some current projects:

- Transition to a Decarbonised UK: technical and socio-political
- Evaluating Options for Carbon Sequestration
- Fuel Cells in the Urban Environment
- Hydrogen's Role in Reducing Greenhouse Gases



Adapting to Climate Change – a *questions* approach

Some current projects:

- New indicators of vulnerability and adaptive capacity
- Representing weather extremes in Integrated Assessment Models
- Corporate adaptation



Sustaining the Coastal Zone – *a place-based approach*

Some current projects:

- Integrated Regional Coastal Simulator
- Vulnerability assessment for the UK coastline
- Linking sea level rise, biodiversity and the economy in the Caribbean



Tyndall Highlights Matrix

Themes Tasks	Integrating Frameworks	Decarbonising modern society	Adapting to Climate Change	Sustaining the Coastal Zone
Flagship Projects	A Modular Multi-Purpose Integrated Assessment System	Transition to a Decarbonised UK: A Technical, Regulatory and Socio-Policy Approach	A Theory of Adaptive Capacity	An Integrated Regional Coastal Simulator
Agenda Setting	An Institute for the Science of Integration	Climate Change and Nuclear Power; Promoting a National Decarbonisation Forum	Climate Change and Development Policy; Representations of Irregular Climate Change	Redesigning-the-Coast Discourse
Strategic Assessments	Towards the Definition of 'Dangerous' Climate Change	Transition to the Decarbonised City; Sustainable Mobility	Justice and Equity in Adaptation; The Vulnerability of London to Climate Change	National Coastline Vulnerability Assessment
Science of Integration	Virtual Decision Theatres	An Integrated Energy System Model	'Smart' Damage Functions for Integrated Assessment Models	Multi-Criteria Decision Theory

Resources

Human Resources

- **Directors** = 2 (+ 2 regional)
- **Core staff** = 9
- **Research fellows** = 4
- **Faculty theme managers** = 6
- **Principal investigators** = 43
- **Contract research staff** = 103
- **PhD students – funded or affiliated** = 15 (+ 20 affiliated)
- **Collaborators & advisors** = ca. 60

Total = ca. 264

2. Tyndall – a Delivery Illustration



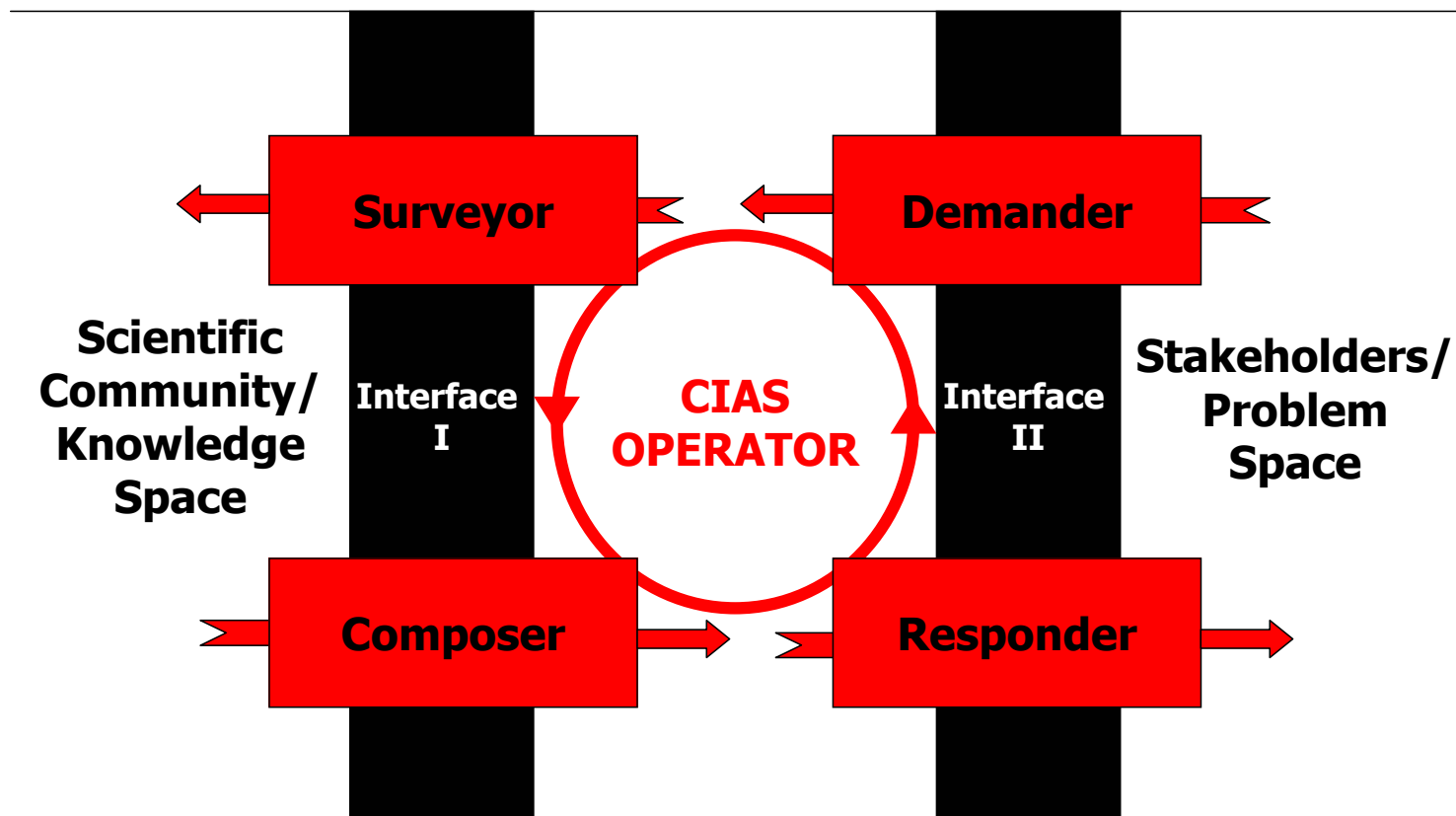
Tyndall I: Delivery

Themes Tasks	Integrating Frameworks	Decarbonising modern society	Adapting to Climate Change	Sustaining the Coastal Zone
Flagship Projects				
Agenda Setting				
Strategic Assessments				
Science of Integration	CIAS			

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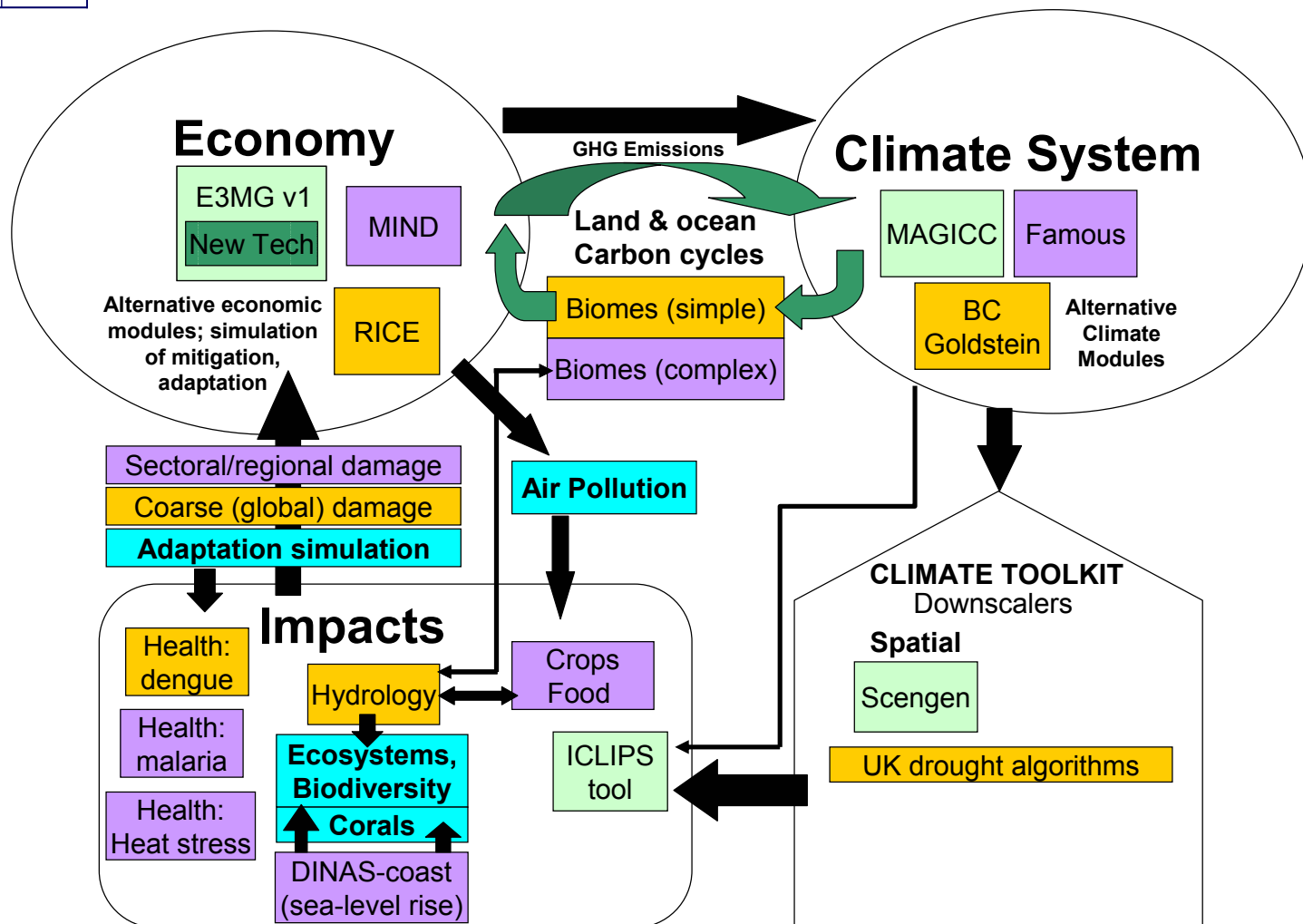
Tyndall I: Delivery

COMMUNITY INTEGRATED ASSESSMENT SYSTEM (CIAS)



	Integrating Frameworks	Decarbonising modern society	Adapting to Climate Change	Sustaining the Coastal Zone
Flagship Projects				
Agenda Setting				
Strategic Assessments				
Science of Integration	CIAS			

Tyndall I: Delivery

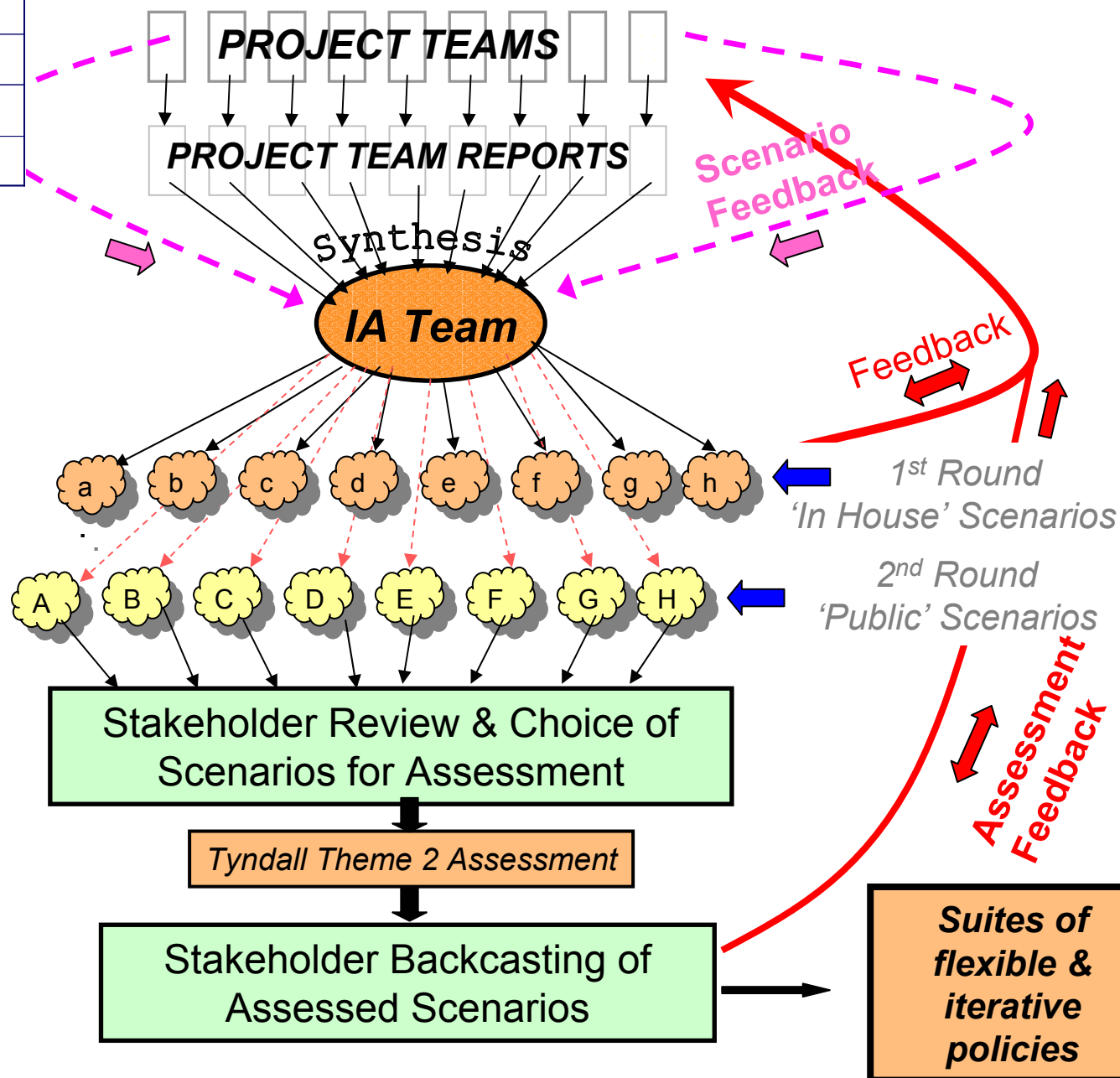


Tyndall I: Delivery

Themes Tasks	Integrating Frameworks	Decarbonising modern society	Adapting to Climate Change	Sustaining the Coastal Zone
Flagship Projects				
Agenda Setting				
Strategic Assessments		Iterated Scenario Analysis of 60% Target		
Science of Integration	CIAS			

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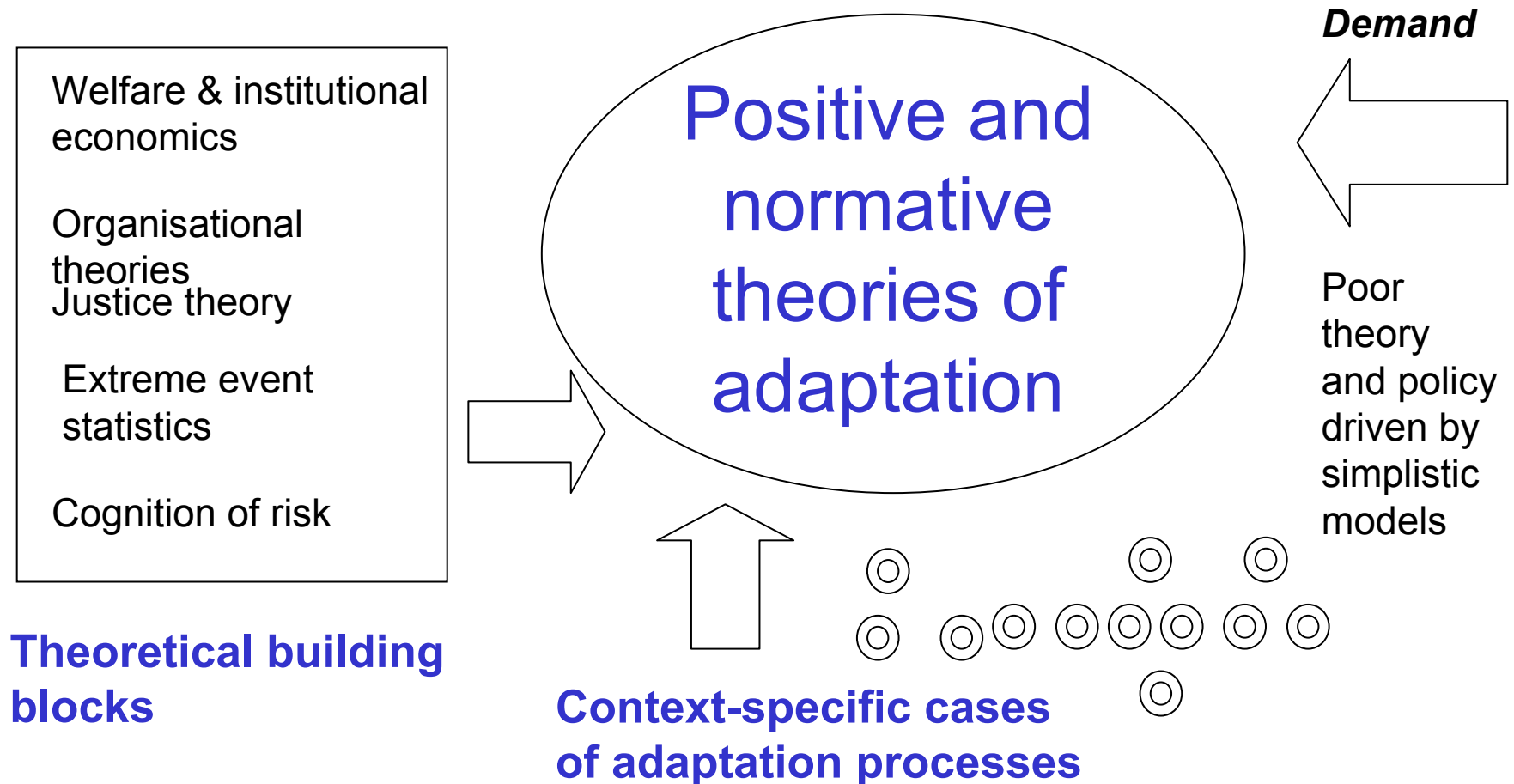
Iterated Scenario Analysis – 60% target



Tyndall I: Delivery

Themes Tasks	Integrating Frameworks	Decarbonising modern society	Adapting to Climate Change	Sustaining the Coastal Zone
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Agenda Setting			Justice and Equity in Climate Change Adaptation	
Strategic Assessments		Iterated Scenario Analysis of 60% Target		
Science of Integration	CIAS			

Platforms for integration



Adaptation: Seven questions

1. Who adapts and to what?
2. What determines adaptive capacity?
3. What are the thresholds?
4. What are justice and equity implications of adaptation?
5. What tools and scenarios do we need?
6. What are the costs and benefits of adaptation?
7. How do we manage adaptation in natural systems?

Highlights from three questions

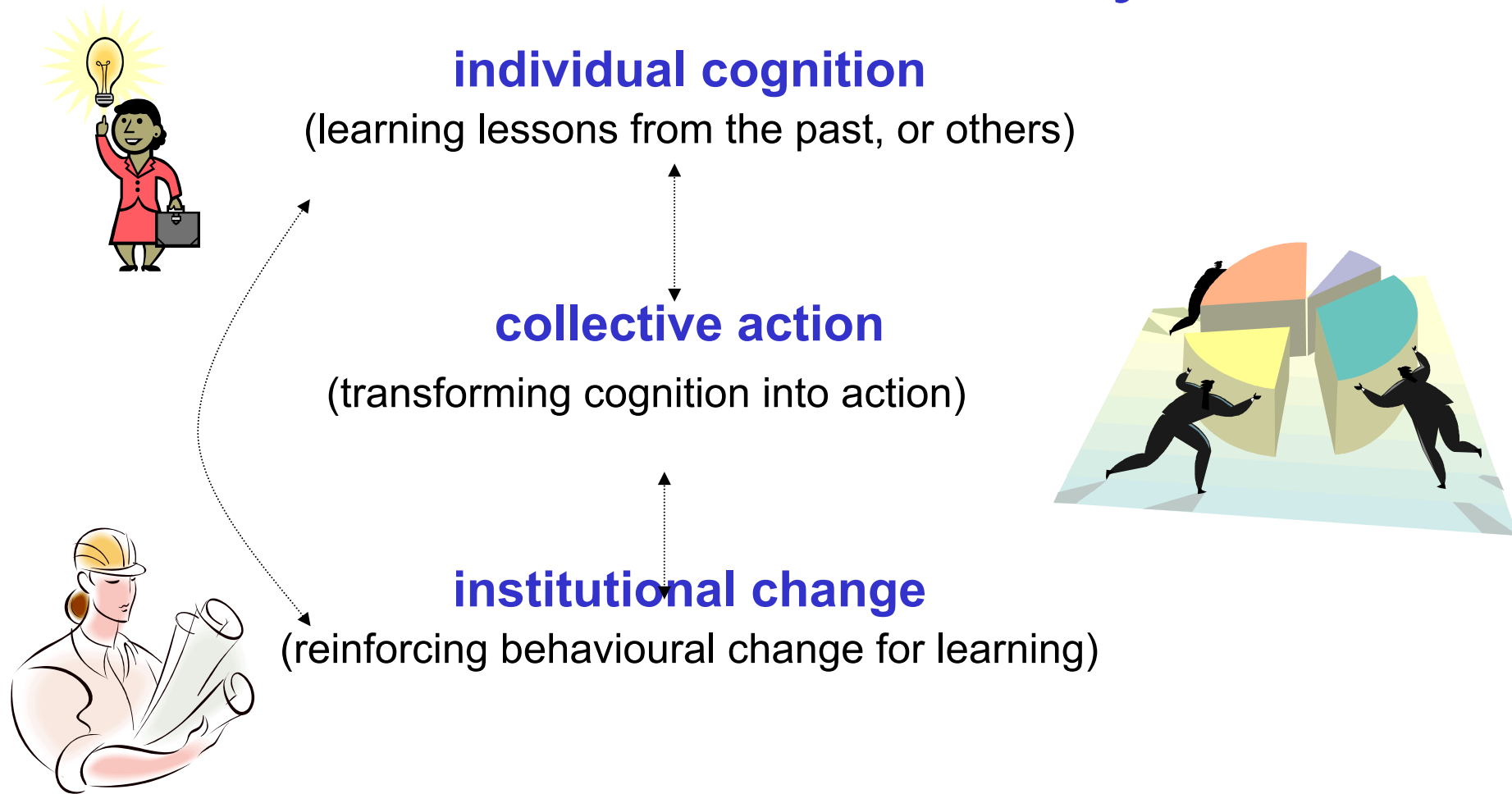
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Adaptive capacity in small islands



How does an island society learn?



Findings: drivers of adaptation

Experience

Persuasion



Reactive adaptation



Anticipatory adaptation

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Tasks				
Flagship Projects				
Agenda Setting			Justice and Equity in Climate Change Adaptation	
Strategic Assessments		Iterated Scenario Analysis of 60% Target		
Science of Integration	CIAS			

Tyndall I: Delivery

Justice in Adaptation to Climate Change



In collaboration with



Justice question: The answer so far

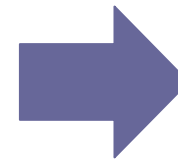
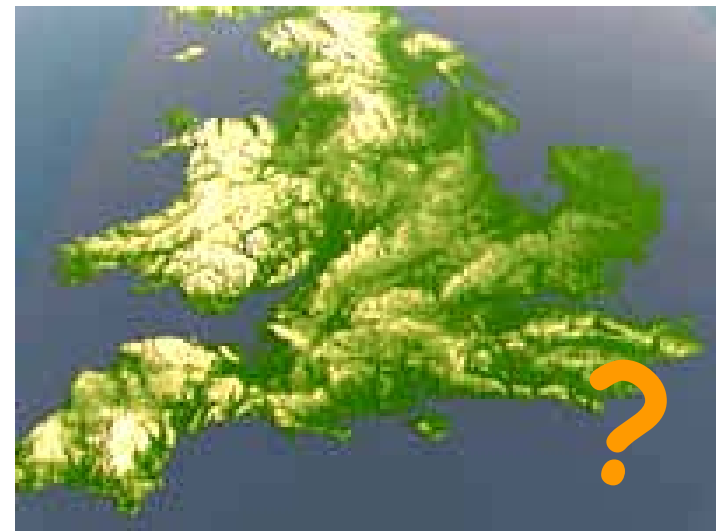
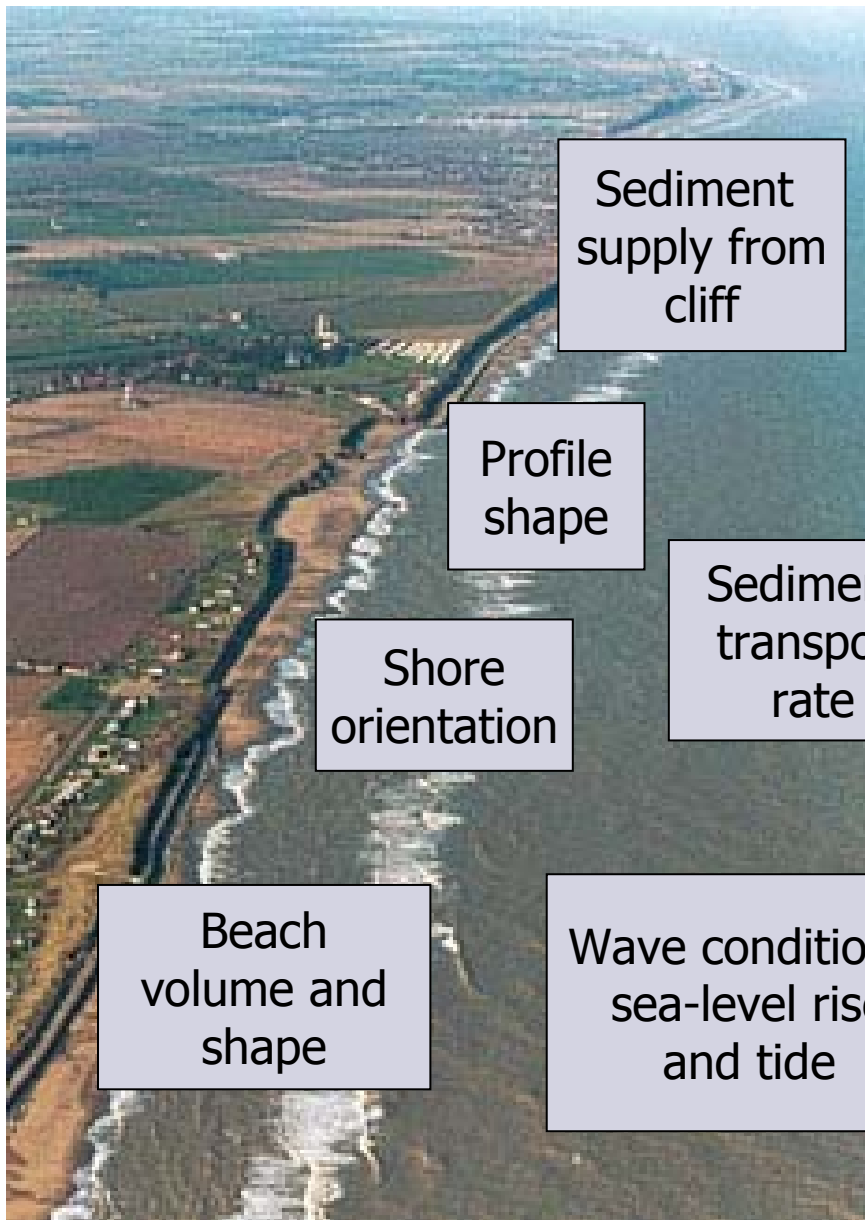
- 1 Fair adaptation requires reducing vulnerability of the most vulnerable
- 2 Present day adaptation strategies reinforce inequities in resource access
- 3 The right to avoid dangerous climate change requires fair process based on impartiality

Tyndall I: Delivery

Themes Tasks	Integrating Frameworks	Decarbonising modern society	Adapting to Climate Change	Sustaining the Coastal Zone
Flagship Projects				An Integrated Regional Coastal Simulator
Agenda Setting			Justice and Equity in Climate Change Adaptation	
Strategic Assessments		Iterated Scenario Analysis of 60% Target		
Science of Integration	CIAS			



Effect on England and Wales of 70 m sea level rise
in the wake of Antarctic ice-sheet melting



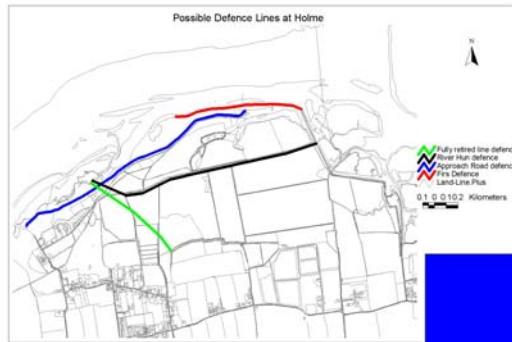
Cliff recession rate

**Coastal Simulator
answers
real-world
questions**

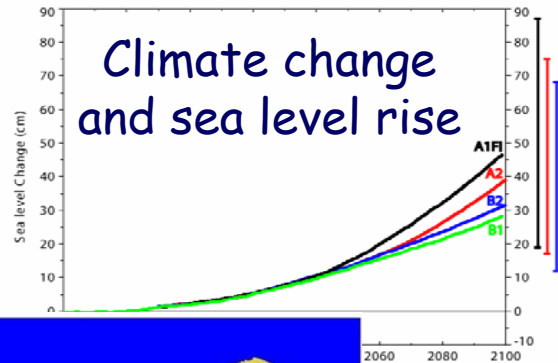
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Tyndall I: Delivery

The Coastal Simulator



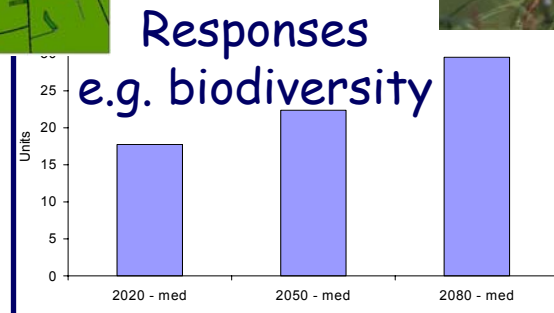
Policy options



Physical and habitat states



Redshanks under policy option 2



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Flagship Projects				An Integrated Regional Coastal Simulator
Agenda Setting			Justice and Equity in Climate Change Adaptation	
Strategic Assessments		Targeted Scenario Analysis of 60% Target		
Science of Integration	CIAS			

Tyndall I: Delivery

The Coastal Simulator

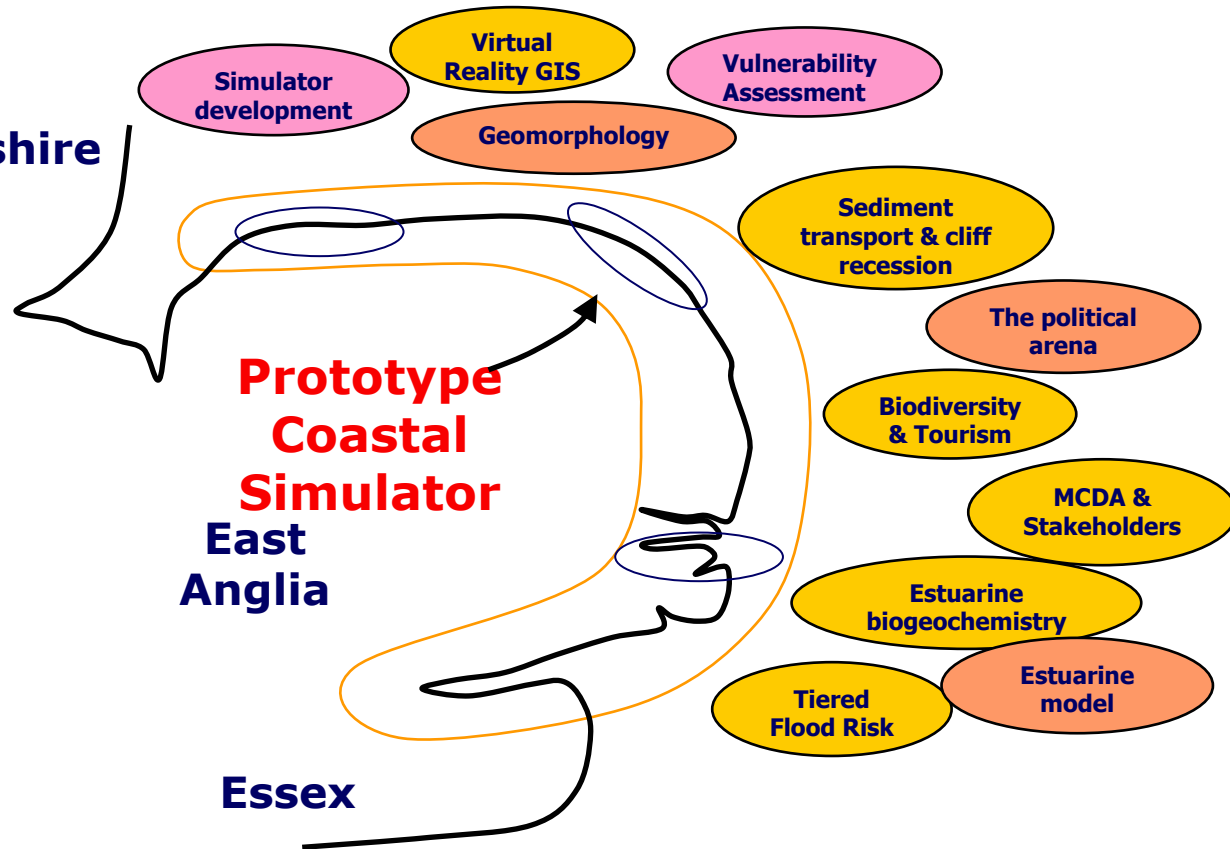


Lincolnshire

Prototype Coastal Simulator

East Anglia

Essex

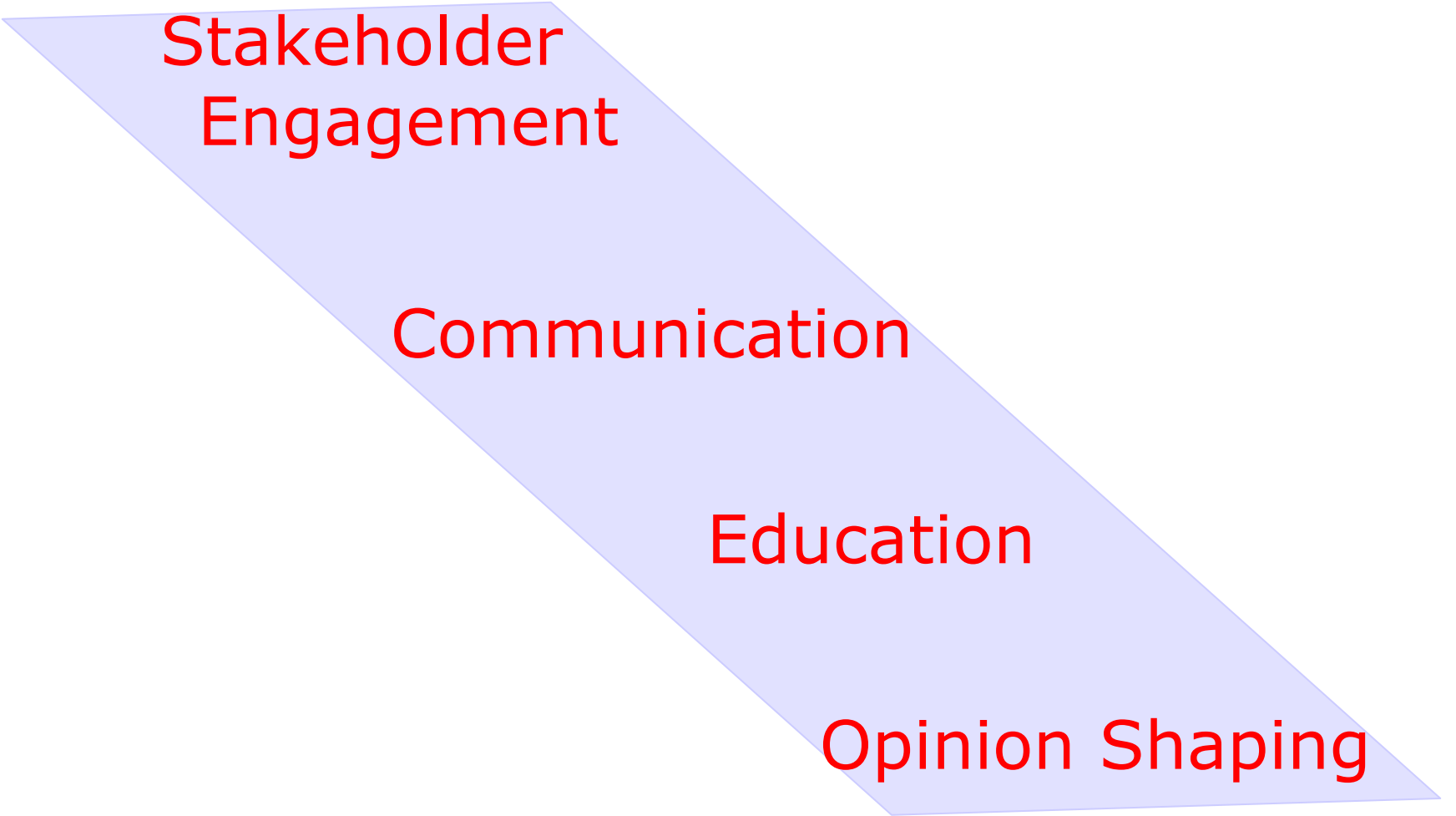


Tyndall I: Delivery

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Agenda Setting			Justice and Equity in Climate Change Adaptation	
Strategic Assessments		Iterated Scenario Analysis of 60% Target		
Science of Integration	CIAS	Innovation Dynamics Modelling	Theory-Building through Dialogue	'Redesigning the Coast' Discourse

Cooperation, Co-Production, Communication





Stakeholder
Engagement

Communication

Education

Opinion Shaping

Communication

External Engagement

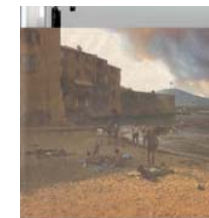
External mechanisms ...

- Placements with DEFRA and Parliamentary Office for Science and Technology
- Business briefings – adaptation, asset management, water (with DTI support)
- **Tynd-all** ... quarterly news e-digest for external audiences
- **the Effect** ... annual magazine
- Media releases, article placements, public speaking, exhibition displays, etc.

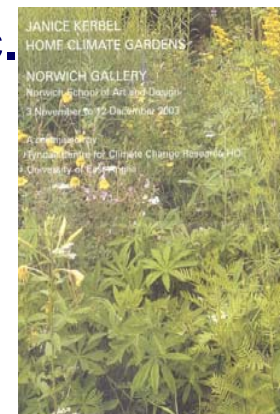
Plus ...

Artists-in-residence

Children's Christmas lectures

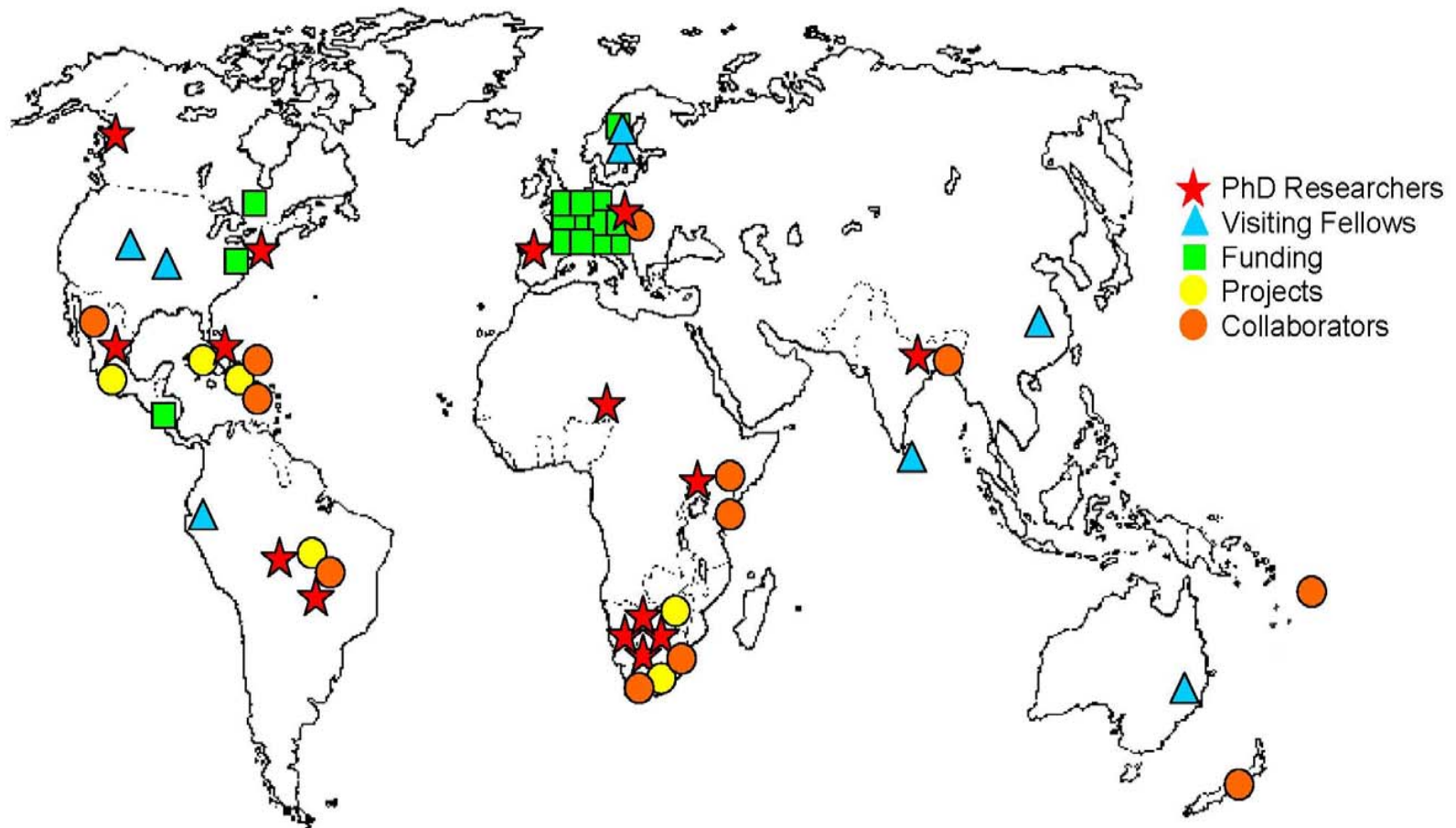


Action stations



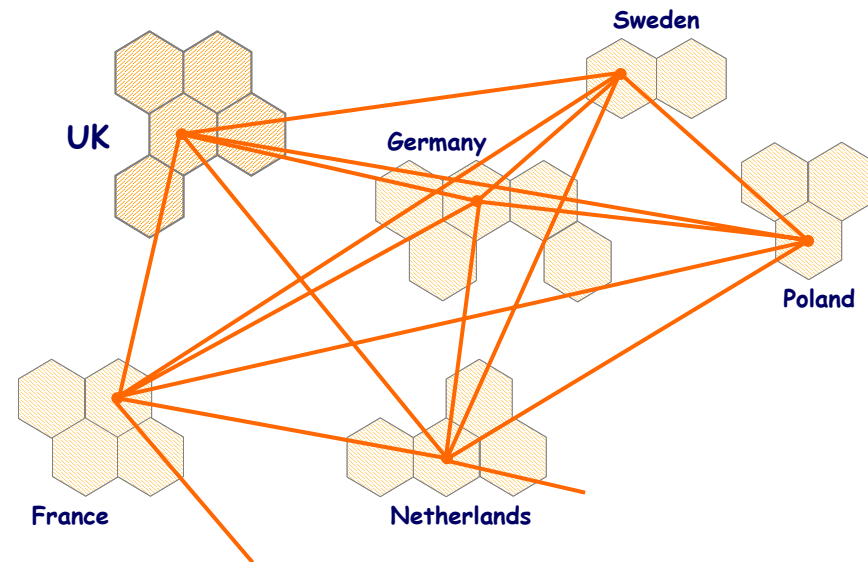
Cooperation

International Research and Collaboration



Some elements of Cooperation Strategy

- Establishing Tyndall-PIK Alliance
(see joint newsletter)
- Advancing European Virtual Institute for Integrated Assessment – E-VIA
(see Milan Summit Document)
- Participation in Global Capacity Building
for Sustainability Science
(see forthcoming Yucatán Summit)



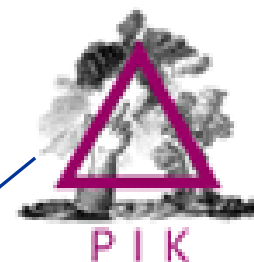
E-VIA Superstructure

Tyndall°Centre
for Climate Change Research



POLES
Brussels, Grenoble, Seville

EE Fondazione
Eni
Enrico Mattei



PAUL SCHERRER INSTITUT
PSI



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Stakeholder Interaction

Stakeholder Interaction: a Strategic **Tyndall** Component



Centre for Social and Economic Research on the Global Environment

C|S|E|R|G|E

DELIBERATIVE AND INCLUSIONARY PROCESSES

A Report from Two Seminars

edited by

**Tim O'Riordan, Jacqueline Burgess
And Bron Szerszynski**

CSERGE Working Paper PA 99-06



Stakeholder Interaction

Strategy

- “Co-development” – users key part of the research process

Approach

- IIAP as an example of user interaction in Phase 1
- Case Study 1 (global-scale stabilisation scenarios): DEFRA
- Case Study 2 (local scenarios of mitigation and adaptation): Sustainable Development Round Table

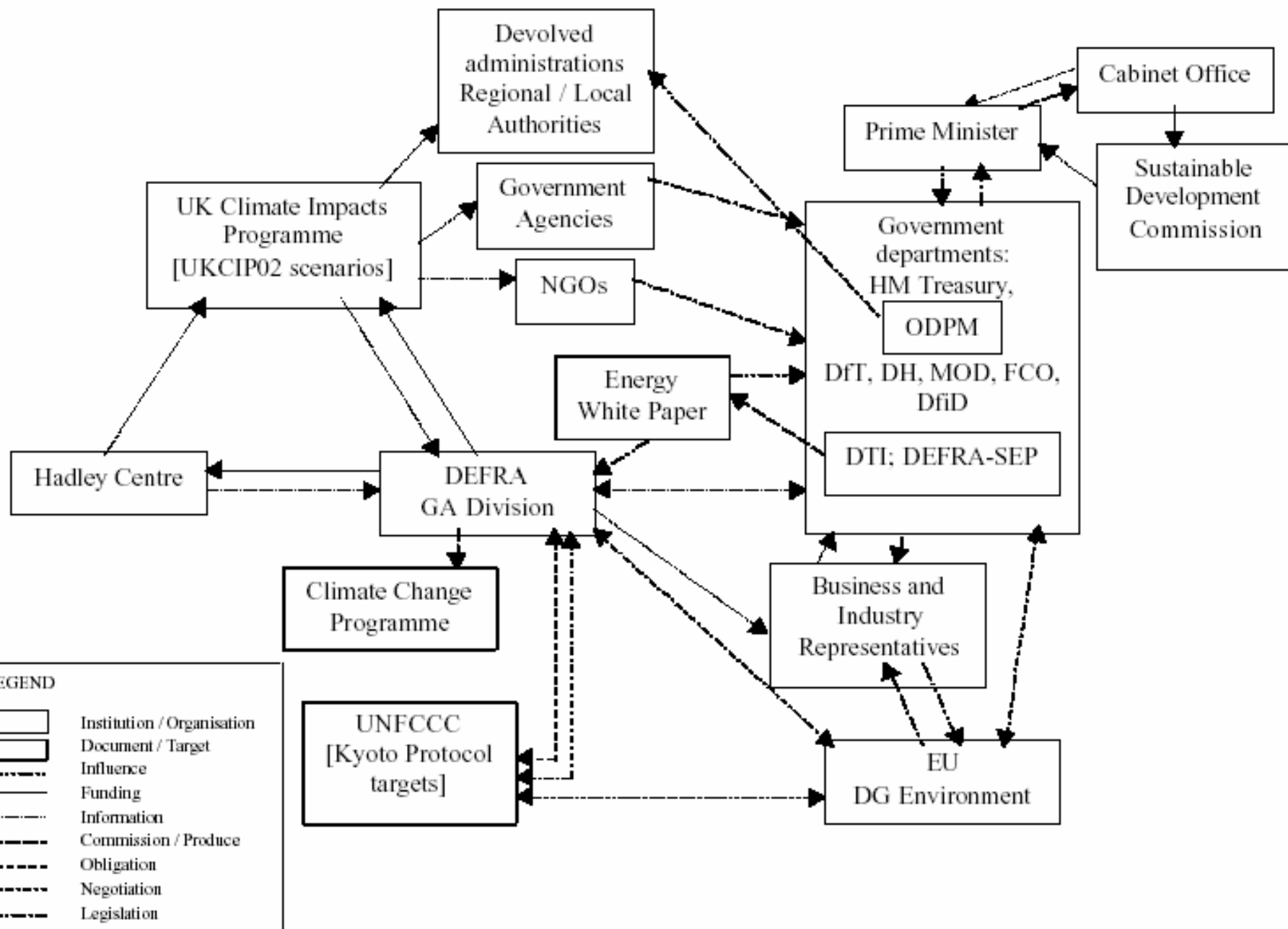
Methodology

- Need for a range of tools - models, scenarios, narratives, synthesis of existing information, images



A survey of users

- Mainstreaming of climate change
- Need for research to inform *responses*
- Strategic Guidance
- Turnpenny, Haxeltine and O'Riordan (2003, 2004)



The local-regional scale

- Energy White Paper - 60% emissions reduction by 2050
- Faced with dealing with impacts of climate change as well
- The context of sustainability
- Massive challenges for the regional level:
Sustainable Development Round Table

A map of the East of England region, showing major cities like London, Norwich, Peterborough, and Cambridge, along with a network of roads and rivers. The map is used as a background for the text.

Informing the region's strategy for adapting to and mitigating climate change by:

- Developing scenarios for 2050, under a 60% emissions reduction, and climate change adaptation
- Outlining potential pathways for getting there
- Use these scenarios to evaluate current policies and plans

What difference can the Tyndall Centre make?



Tyndall°Centre
for Climate Change Research

UEA
NORWICH

'Traveller, there is no road;
you make the road by
walking'.

-Antonio Machado, *Nuevas Canciones*